

REMARKS

Reconsideration and allowance of the subject application are respectfully solicited.

Claims 1, 4, 7, 11, 13, 15, and 17 through 21 are pending, with Claims 1 and 11 being independent. Claims 1 and 11 have been amended. Claims 19 through 21 have been added.

The September 23, 2003 Amendment was objected to under 35 U.S.C. § 132 on the grounds that it introduces new matter, viz, the recitation that the “first diffraction part reduces the incident angle of a light ray which is incident on said second diffraction part”. The Official Action states that the first diffractive part which has positive power would converge the light toward the second diffractive part and therefore could not reduce the angle of incidence. Also, Claims 1, 4, 7, 11, 13, 17, and 18 were rejected under 35 U.S.C. § 112, 1st paragraph, as lacking written description on the grounds that: (a) if the first diffractive part has a positive power, the light will be converged and therefore cannot reduce the incident angle; and (b) if the first diffractive part has a negative power, the light will be diverged and the angle may either be increased or reduced by the diffractive action. All rejections, objections, and statements are respectfully traversed.

Applicant respectfully submits that the objected-to claim language is fully supported, and not new matter, in view of the specification at p. 11, line 25 - p. 14, line 9, and p. 16, line 10 - p. 17, line 11, for example. Applicant respectfully submits that as shown in Figs. 3 and 5, the principal ray (expressed in the specification at p. 13, lines 14-15, as “a ray of off-axis primary light”) differs in behavior against the layered diffraction optical member depending upon whether the layered diffraction optical member is placed in front of a pupil or behind a pupil, i.e.,

in the case that the layered diffraction optical member is placed in front of the pupil, the principal ray will be converged when it enters through the layered diffraction optical member, whereas in the case that the layered diffraction optical member is placed behind the pupil, the principal ray will be diverged when it enters through the layered diffraction optical member. Applicant respectfully notes that the specification expressly states (a) that in the first embodiment, the first diffraction element 106a having a positive power is arranged on the side nearer to the object, which is “effective to reduce the incident angle of light upon the second diffraction element 106b having a negative power” (p. 12, lines 14-19), and (b) that in the second embodiment, the incident angle of light upon the second positive diffraction element is “reduced... by arranging the first diffraction element 202a having a negative power nearer to the object than the second diffraction element 202b having a positive power” (p. 17, lines 1-7). Applicant respectfully submits that in the case where the first diffraction part has a positive power, and the layered diffraction optical member is placed behind the pupil (e.g., Claim 11), the principal ray will be diverged, and thus the first diffraction part reduces the incident angle of the principal ray, which is incident on the second diffraction part.

Claims 1, 4, 7, and 17 were rejected under 35 U.S.C. § 103 over U.S. Patent No. 6,052,234 (Mukai, et al.) in view of U.S. Patent No. 6,157,488 (Ishii). The Official Action states that Mukai, et al. discloses the claimed first diffraction part of negative power and second diffraction part of positive power provided behind, but fails to show that the parts are made of materials having dispersion characteristics different from each other. The Official Action therefore relies upon Ishii as showing the latter feature. All rejections, statement, and reliance are respectfully traversed.

Claim 1 is directed to an imaging optical system and recites, inter alia, a layered diffraction optical member laminated with a plurality of diffraction parts (including first and second diffraction parts as claimed), wherein said layered diffraction optical member is provided in front of a pupil.

However, Applicant respectfully submits that neither Mukai, et al. nor Ishii, even in combination, assuming, arguendo, that the documents could be combined, discloses or suggests at least the above-discussed claimed features as recited, inter alia, in Claim 1. Applicant respectfully submits that in Fig. 7 of Mukai, et al., the pupil plane of the objective optical system (the conjugated plane with the pupil he) exists around the place between the lens unit g1 and the lens unit g2, i.e., the surface S2*[DOE:-] and the surface S3*[DOE:+] are placed to sandwich the pupil between them, as shown on the attached markup of Fig. 7 of Mukai, et al. Applicant respectfully notes that the whole system in Fig. 7 of Mukai, et al. is a viewfinder optical system and not an “imaging” optical system, and that system tg in Fig. 7 of Mukai, et al. fails to provide either a description or suggestion of the above-discussed claimed features. It is also respectfully submitted that there has been no showing of any indication of motivation in the cited documents that would lead one having ordinary skill in the art to arrive at the above-discussed claimed features.

Claims 11, 13, 15, and 18 were rejected under 35 U.S.C. § 103 over U.S. Patent No. 5,636,000 (Ushida, et al.) in view of Ishii. The Official Action states that Ushida, et al. does not explicitly teach the visible wavelength range, but that such a feature is inherently disclosed in Ushida, et al. or obvious in view of Ishii. All rejections and statements are respectfully traversed.

Claim 11 recites, inter alia, that the layered diffraction optical member behind the pupil is formed to have high diffraction efficiency for diffracted light of a particular order over a visible wavelength range to be used in the optical system.

However, Applicant respectfully submits that Ushida, et al. fails to disclose or suggest at least the above-discussed claimed feature as recited, inter alia, in Claim 11, and there has been no showing of any indication of motivation in the cited documents that would lead one to attempt to modify Ushida, et al. with Ishii's teachings to arrive at such a feature. Applicant respectfully submits that Ushida, et al. discloses that the apparatus "relates to a projection exposure apparatus for exposing/transferring fine patterns on a substrate, which apparatus is used for the manufacture of, e.g., semiconductor elements such as LSIs" (e.g., col. 1, lines 7-10), and that in the disclosed embodiment, the "projection lens system having the same arrangement as that in Japanese Patent Laid-Open No. 4-214516 is used" (e.g., col. 14, lines 8-10). Applicant notes that said Japanese document discloses, e.g., that the projection lens system uses a light source having an ultraviolet wavelength, such as a KrF excimer laser. Accordingly, Applicant respectfully submits that Ushida, et al.'s disclosed system is for ultraviolet range use, and that Ushida, et al. therefore does not disclose or suggest at least the above-discussed claimed features including, inter alia, the "visible wavelength range" as claimed. Further, the assertions in the Official Action that the claimed features constitute obvious "design choice", or are inherently disclosed, or that Applicant must show that Ushida, et al. prevents visible wavelength range use are respectfully traversed as being without support. Applicant respectfully submits that G1 and G2 in Ushida, et al. are not formed to have high diffraction efficiency for diffracted light of a particular order over a visible wavelength range, and there has been no showing of any suggestion to change how G1 and G2 are formed. Applicant also submits that the artisan would

not turn to Ishii's diffractive optical element, which is formed by using, e.g., resin material such as UV curable resin and polycarbonate, to attempt to apply the same to that of Ushida, et al. since Ushida, et al.'s system is for ultraviolet use range.

The dependent claims are also submitted to be patentable because they set forth additional aspects of the present invention and are dependent from independent claims discussed above. Therefore, separate and individual consideration of each dependent claim is respectfully requested.

Applicant submits that this application is in condition for allowance, and a Notice of Allowance is respectfully requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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